

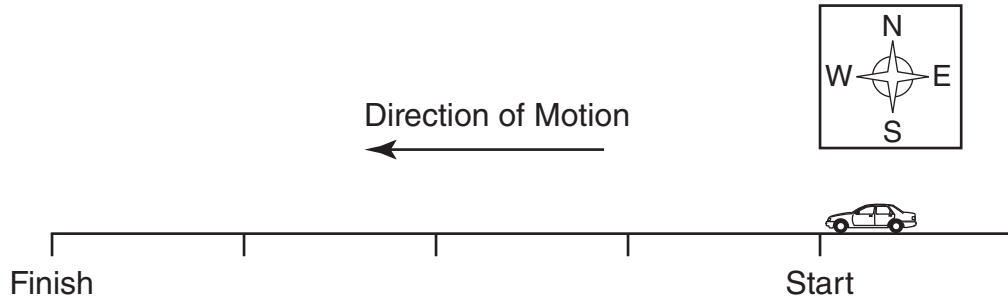
Maryland School
Assessment
Science
2015 Public Release
Grade 5

Part 1



Part 1

- 1 The car shown in the diagram traveled from the start line to the finish line. Each mark on the number line represents 10 meters.

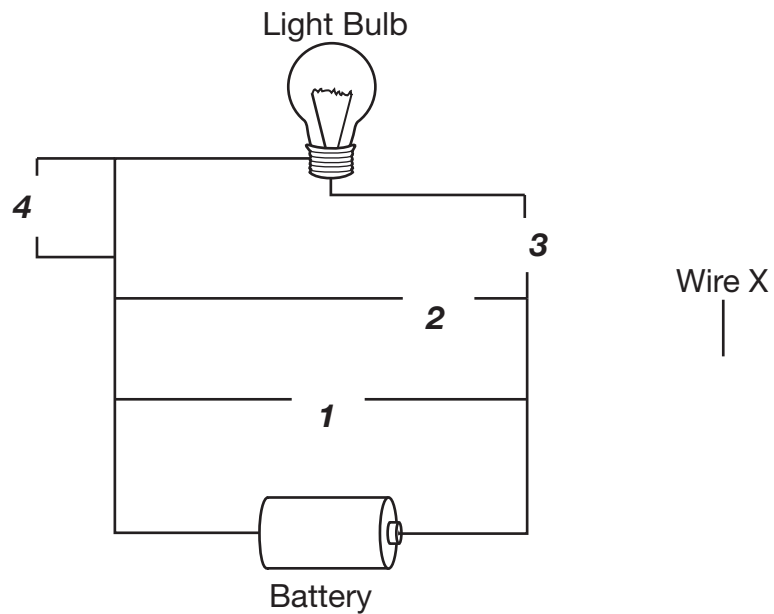


How did the position of the car change from the start line to the finish line?

- ☐ A The car traveled 10 meters east.
- ☐ B The car traveled 40 meters west.
- ☐ C The car traveled 40 meters east.
- ☐ D The car traveled 10 meters west.

Part 1

- 2 The diagram below shows an open circuit.



In which space should Wire X be placed to close the circuit?

- ☐ A 1
- ☐ B 2
- ☐ C 3
- ☐ D 4



Part 1

- 3 A student pumps air into a soccer ball.



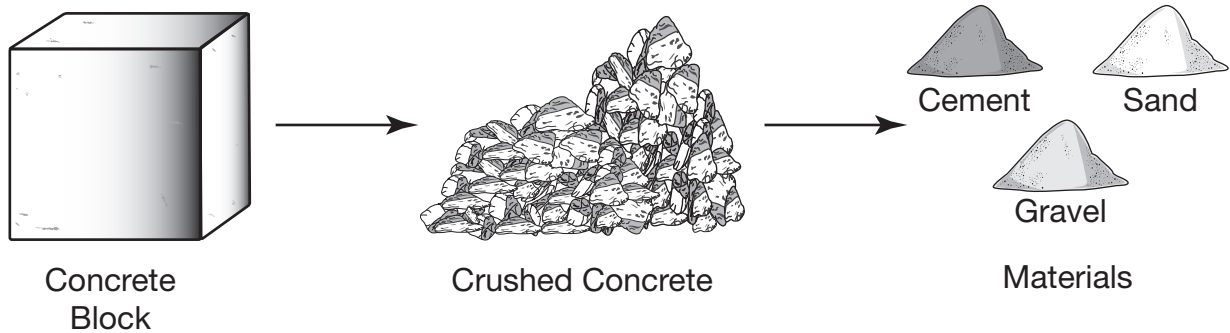
Which statement best explains why the soccer ball changes size?

- ☐ A Air is matter and takes up space.
- ☐ B The air pumped into the ball is cold.
- ☐ C The mass of the ball is decreasing as it is pumped up.
- ☐ D The pump increased the amount of space inside the ball.

Part 1

4

A block of concrete can be broken into smaller pieces, then into the material from which concrete is made, as shown in the diagram below.



Concrete is a mixture because it can be

- ☐ **A** separated into different substances
- ☐ **B** crushed into smaller pieces
- ☐ **C** sorted into different colors
- ☐ **D** formed into a large block



Part 1

Directions

Use the information below to answer Numbers 5 and 6.

Bactrian camels live in the deserts of Asia and have many traits that allow them to survive in this environment.



Information about Bactrian camels is listed below.

- Mammals
- Plant eaters
- Two humps
- Long necks
- Thick, shaggy coats
- Nostrils that close
- Wide, toed hooves
- Bushy eyebrows
- Live in deserts that are cold in the winter and hot in the summer



Part 1

- 5** Camels shed their thick, shaggy coats in the spring.

This ability helps camels survive in an environment that is

- ☐ **A** dry
- ☐ **B** hot
- ☐ **C** rainy
- ☐ **D** windy

- 6** Some of the food that Bactrian camels eat is stored as fat in the two humps.

The stored fat is used later as a source of

- ☐ **A** cells
- ☐ **B** energy
- ☐ **C** traits
- ☐ **D** warmth



Part 1

- 7** Humans use both renewable and nonrenewable resources.

Which human activity uses a nonrenewable resource?

- ☐ **A** building houses with wood
- ☐ **B** using natural gas to heat homes
- ☐ **C** using solar energy to power lights
- ☐ **D** producing electricity from flowing water

Part 1

- 8** Natural processes cause rapid and slow changes to Earth's surface.

Which event causes changes to Earth's surface most rapidly?

- ☐ **A** an earthquake shaking the ground
- ☐ **B** sediment washing into a bay
- ☐ **C** a rainstorm weathering rock
- ☐ **D** water flowing in stream



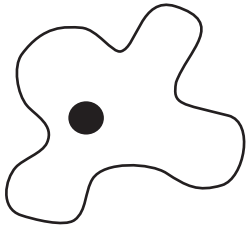
Part 1

Directions

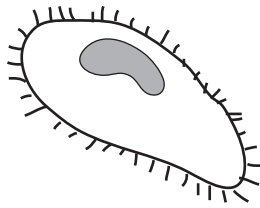
Use the diagrams and information below to answer Numbers 9 through 11.

A student observed single-celled organisms and cells found in multicellular organisms. The student drew the diagrams below.

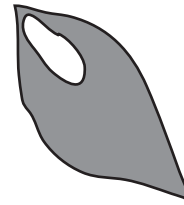
SINGLE-CELLED ORGANISMS



Amoeba



Paramecium

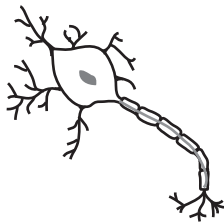


Bacterium

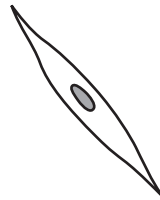
CELLS FROM MULTICELLULAR ORGANISMS



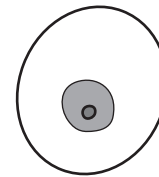
Plant Cell



Nerve Cell



Muscle Cell



Skin Cell

Part 1

9 Food taken in by animals may be directly used to

- ☐ **A** provide oxygen
- ☐ **B** improve balance
- ☐ **C** repair damaged cells
- ☐ **D** protect cells from diseases

10 One reason cells in multicellular organisms vary in appearance is

- ☐ **A** cells take in different amounts of carbon dioxide
- ☐ **B** cells absorb nutrients and sunlight
- ☐ **C** cells grow and repair themselves
- ☐ **D** cells perform different roles

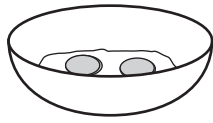
11 Bacteria that break down dead materials are

- ☐ **A** consumers
- ☐ **B** decomposers
- ☐ **C** producers
- ☐ **D** scavengers



Part 1

- 12 A student combined eggs, flour, chocolate, and butter to make a cake.



Eggs



Flour



Chocolate



Butter

The observable properties of the materials after the cake was baked

- ☐ **A** were changed
- ☐ **B** remained separate
- ☐ **C** remained the same
- ☐ **D** were mixed together

STOP

Part 2



Part 2

Directions

Use the passage below to answer Numbers 13 through 15.

Space Junk

Everything seemed normal in space. Astronauts were working on a space station. Suddenly, Mission Control¹ ordered them to leave the station. They rushed to the escape pod.² Inside the pod, they waited for further orders.

A small piece of space junk was speeding toward the space station at 28,000 kilometers (17,500 miles) per hour. The crew could be in danger! Ten minutes later, Mission Control sent an all-clear order. The station and crew were safe.

Leftover Litter

More than 1,600 pieces, large and small, became space junk. There are other kinds of space trash, too. Astronauts drop tools. They lose screws and drop gloves. Even chipped paint can become space junk. So can regular trash that's tossed from space stations.

Small Scraps, Big Damage

All this trash can cause problems. Litter that's orbiting Earth can travel at 7.7 kilometers (about 5 miles) per second. That's fast! No wonder space junk can crack windows, chip heat shields,³ and rip solar panels.

Sometimes space junk falls to Earth. Friction with particles in Earth's atmosphere⁴ causes most junk to burn up. Really big pieces slam into the ground. Some splash into oceans.

That's why scientists track space junk. They use radar and telescopes. These tools can track objects larger than a grapefruit. Millions of pieces are much smaller than this. These small pieces can do big damage. Yet there is no way to track them.



Part 2

Collecting Trash in Space

Scientists are thinking of ways to clean up space. One way is to shoot lasers at space trash. The lasers would push the litter farther away. The only problem is Earth's gravity would eventually pull it back. It would become a problem again later.

Here's another way. Make spacecrafts with giant nets. The nets would catch the litter. Then the litter could be dumped into Earth's atmosphere. The litter would burn up.

Scientists still need to find other solutions. No doubt they will.

¹**Mission Control** – the people who manage space flights

²**pod** – a small room

³**heat shields** – materials that provide protection from extreme heat

⁴**atmosphere** – the whole mass of air surrounding Earth

13 Which force causes orbiting space junk to fall toward Earth?

- ☐ **A** electrical
- ☐ **B** friction
- ☐ **C** gravity
- ☐ **D** magnetic

Part 2

14 As a piece of space junk falls to Earth, it travels

- ☐ **A** less distance in more time
- ☐ **B** equal distance in more time
- ☐ **C** equal distance in equal times
- ☐ **D** greater distance in equal times

15 Collecting space junk before it falls to Earth would most likely have a positive effect on the natural environment by

- ☐ **A** protecting space stations that orbit Earth from the junk
- ☐ **B** keeping the junk from falling into Earth's habitats
- ☐ **C** transforming space junk into useful materials
- ☐ **D** permitting humans to leave junk in space

Part 2

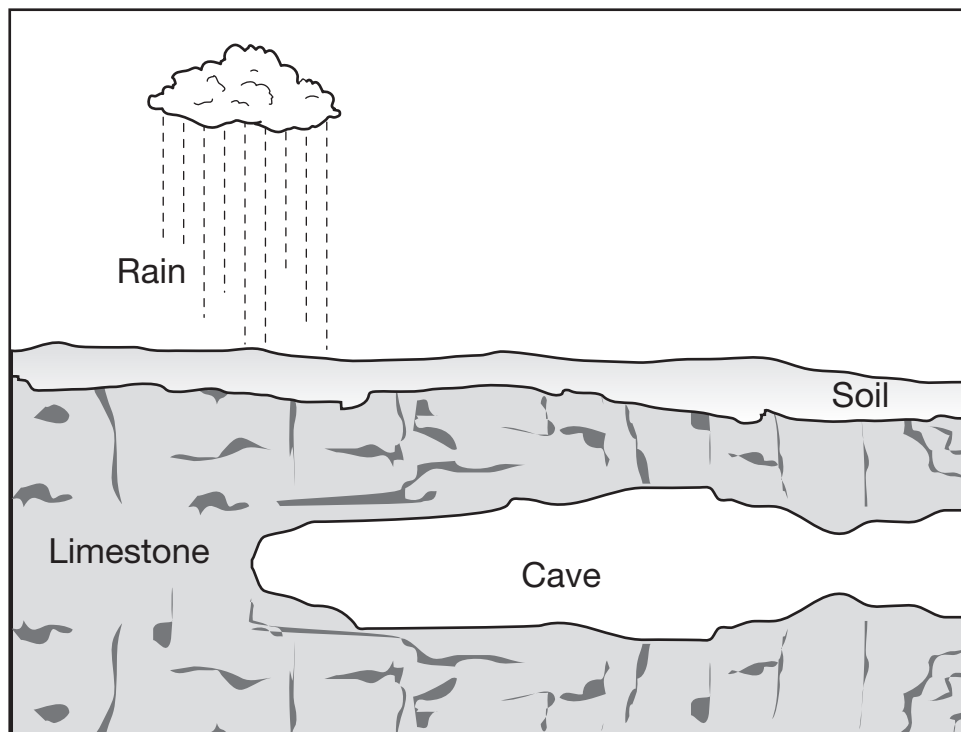
Directions

Use the information and the diagram below to answer Numbers 16 through 18.

Limestone Cave Formation

Rainwater absorbs carbon dioxide as it falls through the air and becomes acidic. The rainwater then seeps through the soil and absorbs more carbon dioxide, causing the water to become more acidic. When the water reaches limestone, which is made of dolomite and other minerals, the water flows into pores and cracks, dissolving the dolomite and carrying away rock. Over time, this process forms caves.

CROSS SECTION OF CAVE FORMATION



Part 2

- 16** Students used several common items to test the hardness of dolomite. The items and the hardness scale value of each item are listed in the table below. The students determined that dolomite has a hardness of about 4.

HARDNESS OF ITEMS

Item	Hardness
Fingernail	2.5
Piece of glass	5.5
Knife blade	5.5
Steel file	6.5
Diamond ring	10

The dolomite most likely showed a scratch made by a steel file but not a scratch from

- ☐ **A** a fingernail
- ☐ **B** a piece of glass
- ☐ **C** a knife blade
- ☐ **D** a diamond ring

Part 2

17 Limestone rock is most likely composed of several minerals because limestone contains different

- ☐ **A** colors
- ☐ **B** cracks
- ☐ **C** fossils
- ☐ **D** soils



Part 2

18 Which process is most involved in forming limestone caves?

- ☐ **A** deposition
- ☐ **B** evaporation
- ☐ **C** filtering
- ☐ **D** weathering

Part 2

- 19** When North America was first explored, people built their homes and towns in certain areas.

Explain why people selected certain areas for their homes and towns. In your explanation, be sure to

- identify the important natural resources needed
- explain why these natural resources are important



Part 2

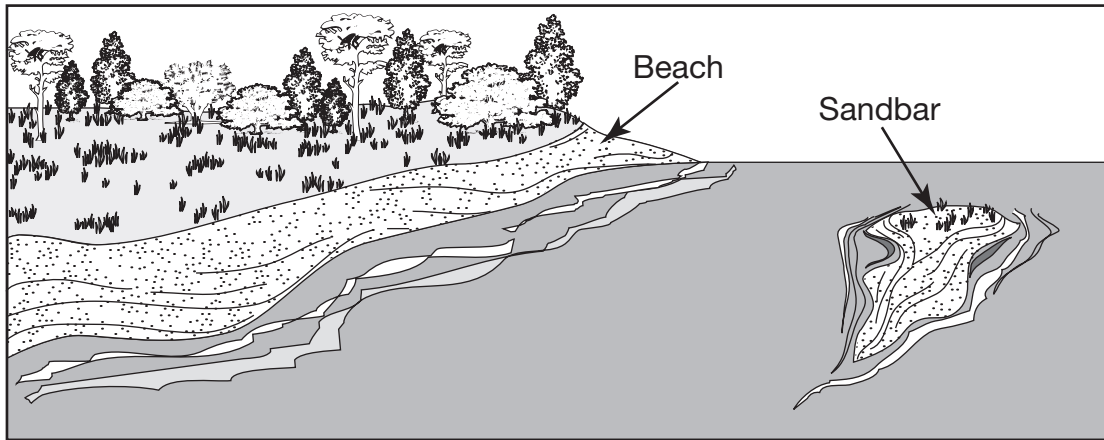
Write your answer in the space provided.

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Part 2

20

A sandbar forms when sand is moved from a beach and is relocated to a new place. A sandbar in a river is shown in the diagram below.



Which processes most often cause this change to Earth's surface?

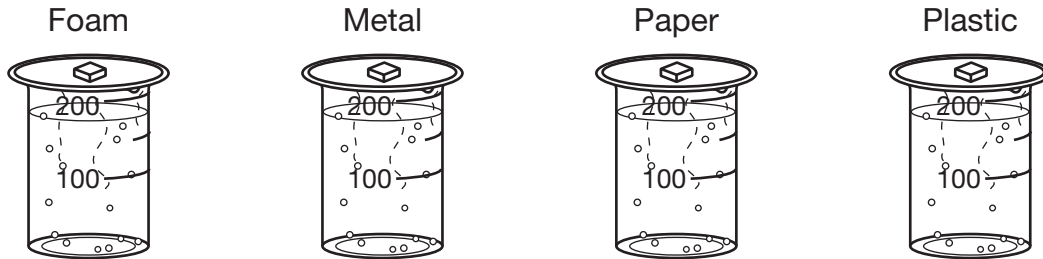
- ☐ A precipitation and weathering
- ☐ B cooling and condensation
- ☐ C heating and evaporation
- ☐ D erosion and deposition



Part 2

21

A teacher placed four types of plates on four beakers of very hot water. The teacher then placed one small, equal-sized piece of butter on each plate. The students measured the amount of time each piece of butter took to melt.



On which plate did the piece of butter most likely melt fastest?

- ☐ A foam
- ☐ B metal
- ☐ C paper
- ☐ D plastic



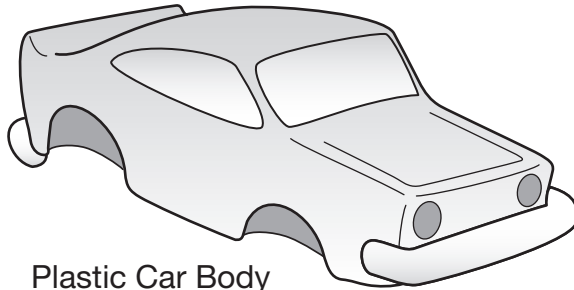
Part 2

Directions

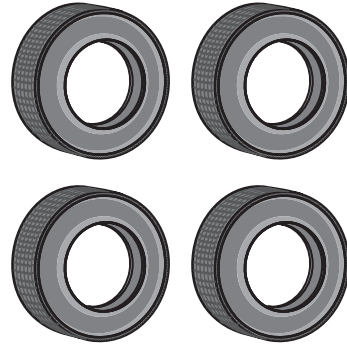
Use the information below to answer Numbers 22 and 23.

Model Cars

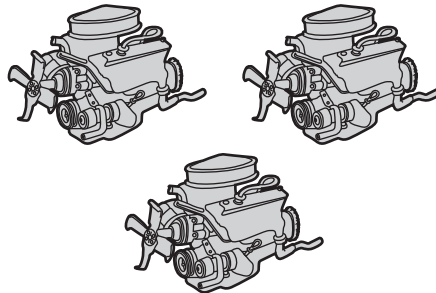
Students used a model car kit to construct different model cars.



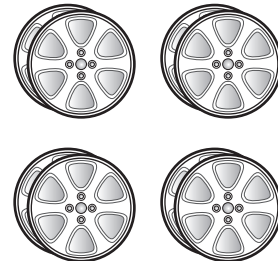
Plastic Car Body



Rubber Tires



Metal Motors

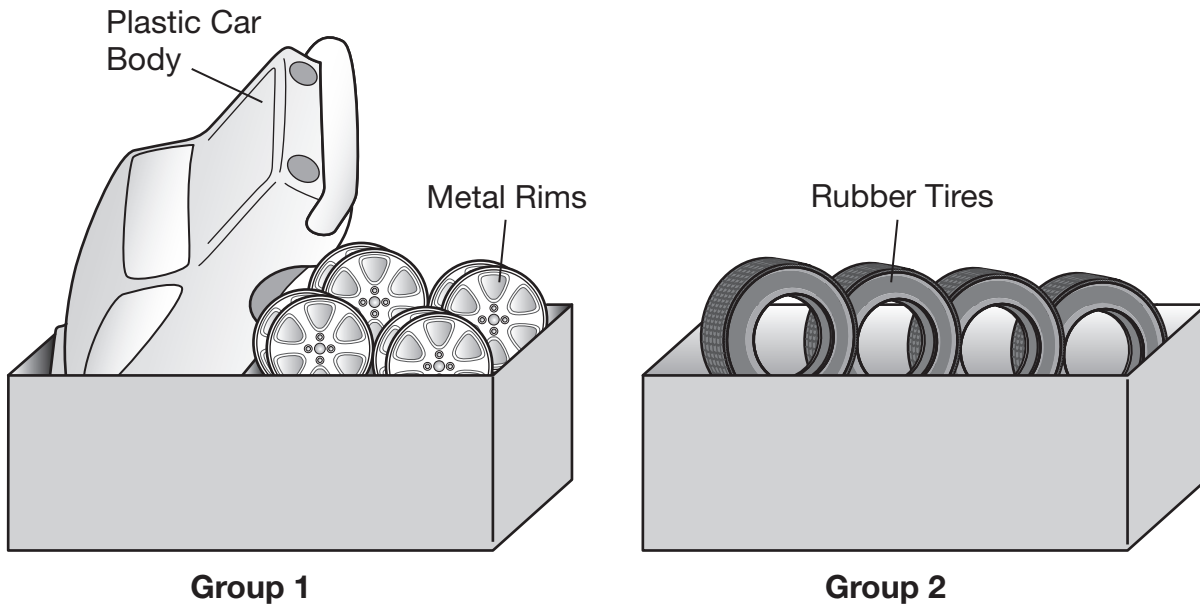


Metal Rims



Part 2

- 22** The students separated some of the model car parts into two groups according to a physical property, as shown in the diagram below.



The physical property the students most likely used to separate the model car parts was

- ☐ **A** strength
- ☐ **B** hardness
- ☐ **C** ability to conduct electricity
- ☐ **D** ability to be attracted by a magnet

Part 2

23 All of the pieces in the model car kit occupy space and have

- ☐ **A** a definite amount of mass
- ☐ **B** an equal amount of mass
- ☐ **C** the same hardness
- ☐ **D** the same volume



Part 3



- 24** Scientists compared Pluto with other objects in the solar system and found that Pluto is smaller than Earth's moon.

This finding caused scientists to question whether Pluto is a planet because

- ☐ **A** Pluto gets less sunlight than Earth's moon
- ☐ **B** the other planets are much larger than Pluto
- ☐ **C** the other planets have moons and Pluto does not
- ☐ **D** Pluto rotates on its axis and the other planets do not

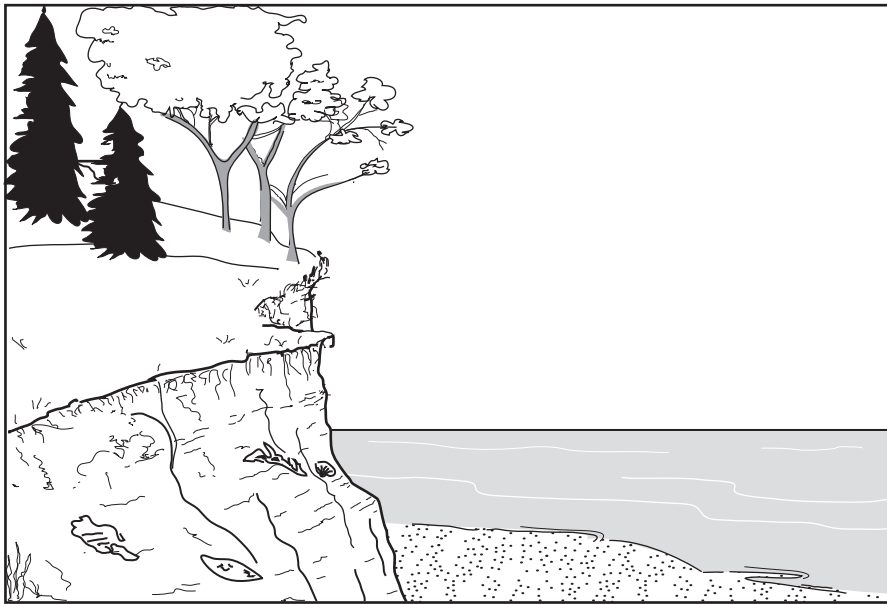


Directions

Use the information below to answer Numbers 25 and 26.

The beaches along the face of Calvert Cliffs in southern Maryland attract many fossil hunters each year. At high tide the beach is covered with water, but at low tide fossil hunters can search the face of the cliff and often discover fossils.

Fossils at Calvert Cliffs



25 Fossils found at Calvert Cliffs were formed millions of years ago when

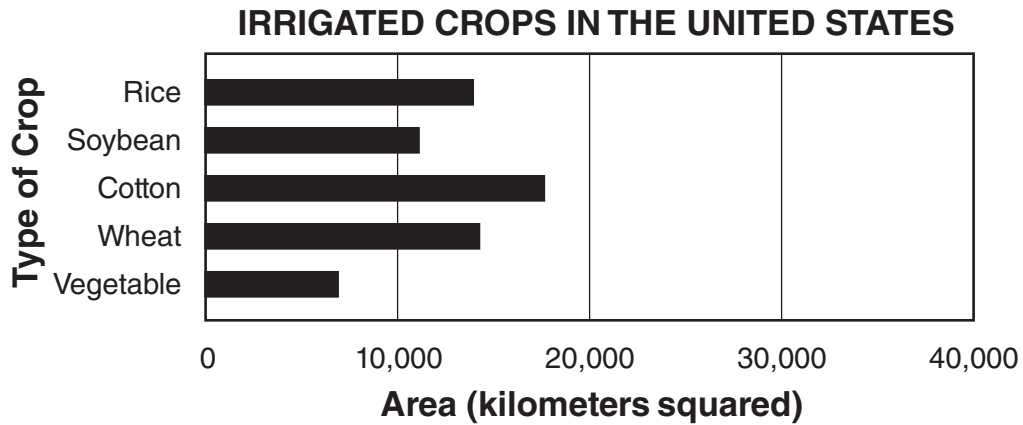
- ☐ **A** animal bones left minerals in soil
- ☐ **B** animal teeth dissolved in the ocean
- ☐ **C** sea shells were covered by sediments
- ☐ **D** sea shells were broken down into smaller pieces

26 The discovery of a whale's tooth high on one of the Calvert Cliffs indicates that, millions of years ago, the cliffs were most likely covered by

- ☐ **A** a glacier
- ☐ **B** an ocean
- ☐ **C** a mountain
- ☐ **D** a rainforest



- 27** Irrigation is the delivery of water by some way other than nature. Farmers often irrigate crops when rainfall does not provide enough water for the crops to survive.



Which irrigated crop occupies the greatest area?

- ☐ **A** rice
- ☐ **B** soybean
- ☐ **C** cotton
- ☐ **D** wheat

Directions

Use the passage below to answer Numbers 28 through 30.

Turtle Travels

Out From the Sand

A clutch of eggs lies hidden more than two feet below a sandy beach. Inside each one, there may be a baby green sea turtle.

From the Sand to Sea

The hatchling's journey to the water is a race for survival. She is no bigger than a walnut. Crabs and night herons snatch up some of the other hatchlings on the beach. This young turtle makes it to the water.

To the Open Ocean

The turtle's journey through the open ocean may last several years. Scientists think green sea turtle hatchlings float with mats of *sargassum*. This seaweed provides a hiding place as well as food.

The hatchling may snack on shrimp, small jellyfish and snails that drift in and around the seaweed. Unfortunately,¹ the sea also contains plastic and trash that people throw away. Eating them could be a deadly mistake for the turtle.

There are many other dangers in the sea, too. Predators such as sharks swim below the small turtle. Large birds fly above.

Growing Up Green

The sea turtle's new home is the warm waters along Florida's east coast. With her larger shell, she is safer in the near-shore waters than she was as a hatchling.

Eating sea grass and algae has turned her body fat a green color. In fact, this is how green sea turtles get their name!



Return

Now the adult turtle sets out on a new adventure.

She must return to the beach where she was born to lay her eggs.

Scientists are still learning how sea turtles find their way through the ocean. They think the turtles may sense changes in Earth's magnetic field.² That may help the turtles create a kind of mental map.³

The Next Generation

Out of the water, she struggles to move on land. She reaches a place where high tides will not wash away her eggs. Then she starts to dig.

She lays more than 100 leathery white eggs. She packs sand over them. Then she uses her flippers to toss sand to cover her nest.

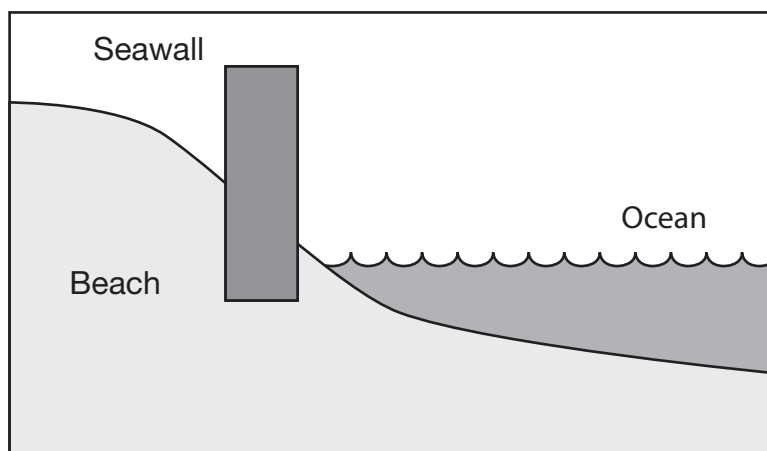
After about two months in the nests, new green sea turtles will hatch. They will begin their own journeys.

¹**Unfortunately** – in an unlucky manner

²**magnetic field** – the area affected by a magnet

³**mental map** – a person's view of the world

28 Seawalls are sometimes built along shorelines.



Seawalls negatively affect the ability of turtles to survive because a seawall

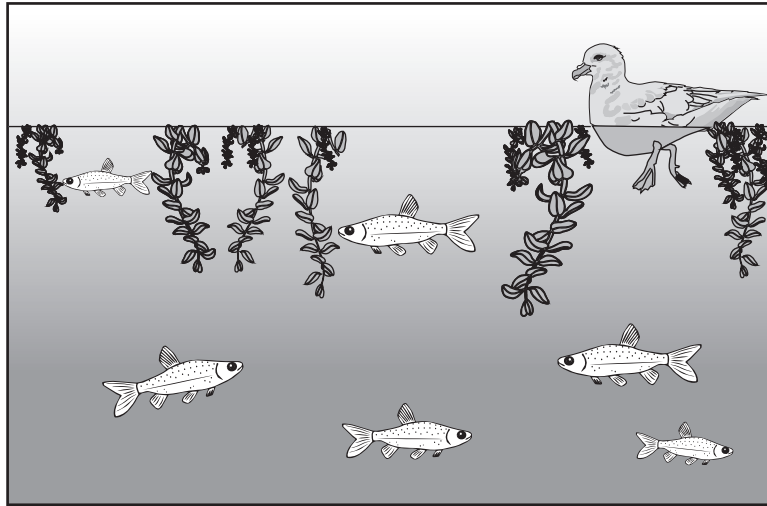
- ☐ **A** protects the turtles from predators
- ☐ **B** protects the sand along the shoreline
- ☐ **C** destroys the beach near the turtle eggs
- ☐ **D** blocks the beach where the turtle eggs hatch



29 Humans negatively affect the environment of the turtle hatchlings by

- ☐ **A** fishing from a boat
- ☐ **B** driving electric vehicles
- ☐ **C** recycling aluminum cans
- ☐ **D** throwing plastic into the ocean

- 30 The *sargassum* seaweed is the habitat for many organisms, including green sea turtle hatchlings, fish, snails, and some species of birds.



Explain the interactions of organisms in the *sargassum* habitat. In your explanation, be sure to include

- the roles of each organism



Part 3

Write your answer in the space provided.

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Directions

Use the information and the diagram below to answer Numbers 31 and 32.

Snow Melt

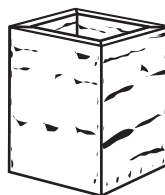
Students placed 500 grams of snow into each of four containers made of different materials as shown in the diagram below. The students then placed the containers of snow outside in the sunlight.



Glass Jar



Foam Cup



Wooden Box



Metal Bucket



- 31** The outside temperature increased and the students observed that the containers were empty.

The snow in the containers most likely changed

- ☐ **A** to a liquid and then to a solid
- ☐ **B** to water vapor (gas) and then to a solid
- ☐ **C** to a liquid and then to water vapor (gas)
- ☐ **D** to water vapor (gas) and then to a liquid

- 32** Snow is a form of matter because snow

- ☐ **A** has mass
- ☐ **B** melts into liquid water
- ☐ **C** takes up space and has mass
- ☐ **D** takes up less space when it melts

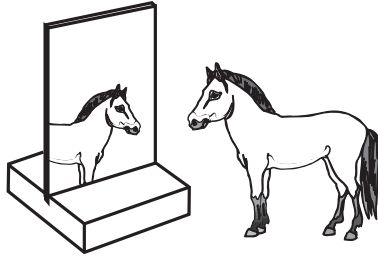


Part 3

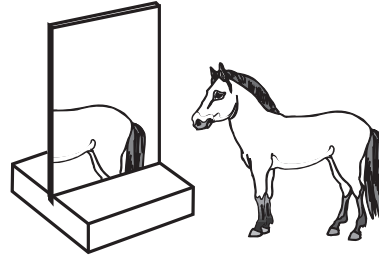
- 33 A pony is standing directly in front of a plane mirror.

Which drawing best shows the image of the pony in the plane mirror?

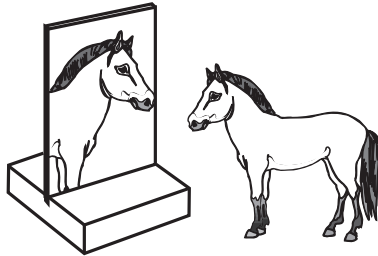
☐ A



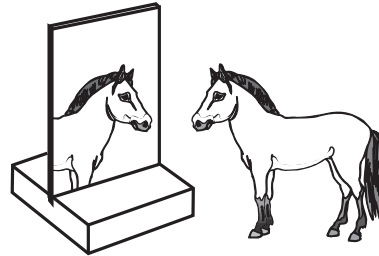
☐ B



☐ C



☐ D



- 34** Students measured how long it took for an ice cube to melt.

Which measurement best represents how long it took for the ice cube to melt?

- ☐ **A** 20° Celsius
- ☐ **B** 40 grams
- ☐ **C** 60 milliliters
- ☐ **D** 80 seconds



Part 4

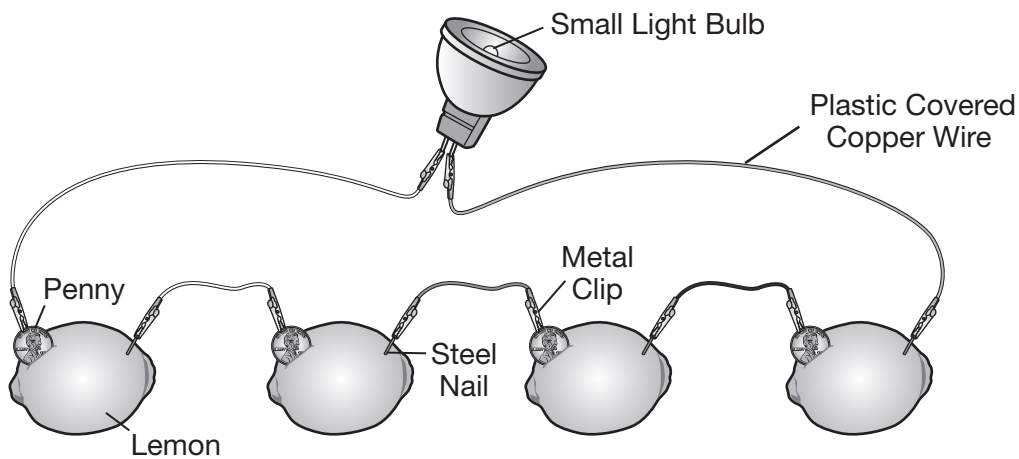


Directions

Use the information below to answer Numbers 35 and 36.

Lemon Battery

A group of students constructed an electric circuit using four lemons, four pennies, four steel nails, metal clips, copper wires, and a small light bulb. The students completed the connections properly, and the small light bulb glowed.



not drawn to scale

35 The small light bulb in the lemon battery electric circuit glows when electricity moves

- ☐ **A** through the closed circuit
- ☐ **B** through the open circuit
- ☐ **C** away from the lemons
- ☐ **D** toward the light bulb

36 The students placed the lemon battery electric circuit next to a window on a sunny day. After several minutes the metal clips became warm. However, the outside of the lemons remained cool.

The outside of the lemons remained cool because lemons are

- ☐ **A** poor conductors of heat energy
- ☐ **B** good conductors of heat energy
- ☐ **C** poor conductors of electrical energy
- ☐ **D** good conductors of electrical energy

37 Earth revolves around the sun.

The amount of time needed for Earth to complete one revolution around the sun is approximately

- ☐ **A** 1 day
- ☐ **B** 28 days
- ☐ **C** 180 days
- ☐ **D** 365 days

38 Offshore oil platforms affect ocean habitats.

An ocean environment is most likely damaged by an offshore oil platform because

- ☐ **A** leaking oil from the oil platform might pollute the water
- ☐ **B** fishing from the oil platform might reduce the fish population
- ☐ **C** drilling in the ocean floor might reduce the water temperature
- ☐ **D** changing the ocean floor might increase the number of hurricanes

- 39** Paleontologists often find and study the remains of ancient plants and animals.

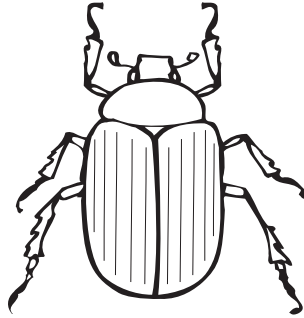
When the remains of ancient plants and animals are covered by layers of sediment over time, the remains

- ☐ **A** melt
- ☐ **B** dissolve
- ☐ **C** become a fossil
- ☐ **D** evaporate into vapor



40

Students observed a beetle in a science class. The students determined the beetle was a dung beetle.



Explain the procedure the students most likely used to identify the beetle. In your explanation, be sure to include

- the best sources of reliable data
- the features used to identify the beetle

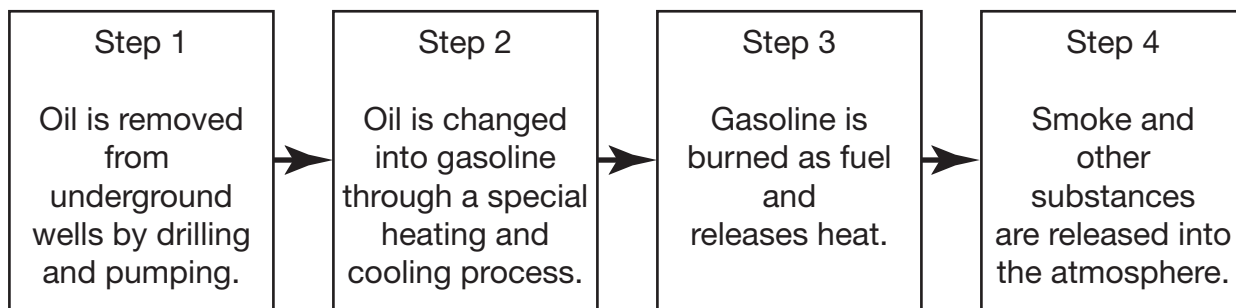


[illegible]

Directions

Use the information and diagram below to answer Numbers 41 through 43.

Oil is a natural resource from which many useful products are made. These products include materials such as plastics, paints, clothing, and fuels. One important product made from oil is gasoline, which is used in automobiles. A student constructed the diagram below to show some of the changes oil goes through as it is refined into gasoline and then used by humans.



41 A negative effect of the use of gasoline made from oil is an increase in the

- ☐ **A** number of cars
- ☐ **B** amount of litter
- ☐ **C** number of landfills
- ☐ **D** amount of air pollution

42 Which unit of measurement would be used to find the volume of oil?

- ☐ **A** degree
- ☐ **B** gram
- ☐ **C** milliliter
- ☐ **D** millimeter

43 There is no arrow drawn from Step 4 back to Step 1 because oil is

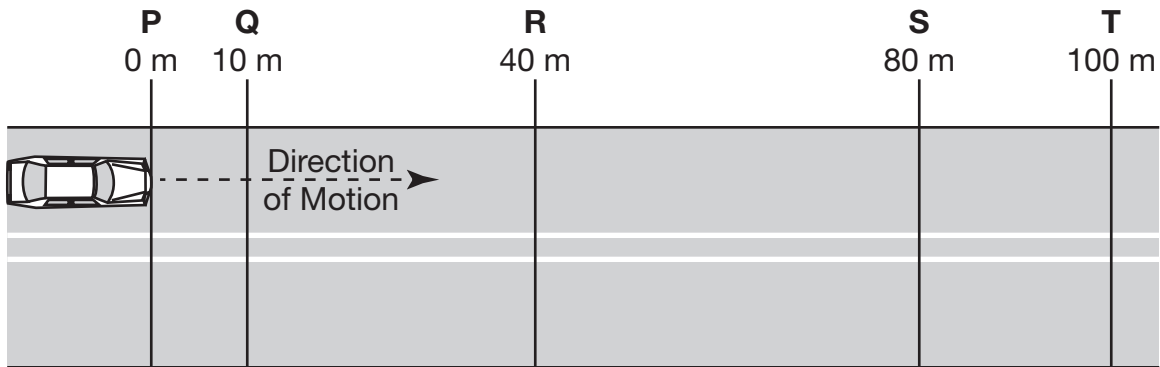
- ☐ **A** a renewable resource
- ☐ **B** usually found by drilling
- ☐ **C** heated to make gasoline
- ☐ **D** a nonrenewable resource

44 Maryland has many renewable and nonrenewable natural resources.

Which group contains only renewable resources found in Maryland?

- ☐ **A** wind, oil, coal
- ☐ **B** fish, coal, wind
- ☐ **C** oil, water, trees
- ☐ **D** trees, water, fish

- 45** A car traveled a total distance of 100 meters from Point P to Point T.



The car traveled the farthest between which two points?

- ☐ A P and Q
- ☐ B Q and R
- ☐ C R and S
- ☐ D S and T

- 46** A beaker containing 50 milliliters of ice is placed on a windowsill. After several hours, the ice melts.

What property of the ice did not change when it melted?

- ☐ A the mass
- ☐ B the volume
- ☐ C the temperature
- ☐ D the state of matter

Acknowledgements

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